

## I CLAIM:

1. A system for selectively routing data within a fibre channel arbitrated loop, comprising:

an intra-loop router configured to be coupled between a first segment  
5 and a second segment of the fibre channel arbitrated loop, the intra-loop router including:

a router controller configured to be operatively coupled with a receive lead and a transmit lead of the first segment, and with a receive lead and a transmit lead of the second segment; and

10 a processing system coupled with the router controller and configured to cause fibre channel frames received by the router controller to be re-transmitted by the router controller onto a selected one of the first and second segments.

15 2. The system of claim 1, where the router controller includes two fibre channel interface controllers configured to be respectively coupled with the first and second segments.

20 3. The system of claim 1, where the processing system is configured to maintain first segment device identifiers which identify devices connected to the first segment.

4. The system of claim 3, where the intra-loop router is configured to cause a fibre channel frame received from the second segment to bypass the first segment, unless addressing information embedded within such fibre channel frame correlates with at least one the first segment device identifiers.

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5. The system of claim 3, where the first segment device identifiers include arbitrated loop physical addresses of the devices connected to the first segment.

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6. The system of claim 3, where the processing system is configured to correlate the first segment device identifiers with second segment logical identifiers, to make the devices connected to the first segment logically accessible from the second segment.

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7. The system of claim 3, where the intra-loop router is configured so that, if one of the first segment device identifiers causes a conflict on the second segment, the intra-loop router obtains a non-conflicting logical identifier corresponding to such first segment device identifier during initialization of the second segment, and where the processing system is configured to map the non-conflicting logical identifier to such first segment device identifier to avoid the conflict.

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8. The system of claim 1, where the processing system is configured to maintain, for a fibre channel device connected to the first segment, a second segment logical identifier enabling the device to be logically accessed from the second segment.

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9. A segmented fibre channel arbitrated loop, comprising:  
a main segment;  
a side segment; and  
10 an intra-loop router coupled between the main segment and the side segment, the intra-loop router comprising:

a router controller coupled between the main segment and the side segment; and

15 a processing system coupled with the router controller and configured to cause fibre channel frames received by the router controller to be re-transmitted onto a selected one of the main segment and side segment.

20 10. The segmented fibre channel arbitrated loop of claim 9, where the processing system maintains identifying information about devices connected to the side segment, and where the processing system causes fibre channel frames received from the main segment to bypass the side segment unless those frames target at least one of the devices on the side segment.

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11. The segmented fibre channel arbitrated loop of claim 9, where the router controller includes two fibre channel interface controllers respectively coupled with the main segment and side segment.

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12. The segmented fibre channel arbitrated loop of claim 9, where the processing system is configured to maintain side segment device identifiers which identify devices connected to the side segment.

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13. The segmented fibre channel arbitrated loop of claim 12, where the intra-loop router is configured to cause a fibre channel frame received from the main segment to bypass the side segment, unless addressing information embedded within such fibre channel frame correlates with at least one the side segment device identifiers.

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14. The segmented fibre channel arbitrated loop of claim 12, where the side segment device identifiers include arbitrated loop physical addresses of the devices connected to the side segment.

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15. The segmented fibre channel arbitrated loop of claim 12, where the processing system is configured to correlate the side segment device identifiers with main segment logical identifiers, to make the devices connected to the side segment logically accessible from the main segment.

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16. The segmented fibre channel arbitrated loop of claim 12, where the intra-loop router is configured so that, if one of the side segment device identifiers causes a conflict on the main segment, the intra-loop router obtains a non-conflicting logical identifier corresponding to such side segment device identifier during initialization of the main segment, and where the processing system is configured to map the non-conflicting logical identifier to such side segment device identifier to avoid the conflict.

10 17. The segmented fibre channel arbitrated loop of claim 9, where the processing system is configured to maintain, for a fibre channel device connected to the side segment, a main segment logical identifier enabling the fibre channel device to be logically accessed from the main segment.

15 18. The segmented fibre channel arbitrated loop of claim 9, further comprising a second side segment coupled with the main segment via a second intra-loop router.

19. A method of improving performance of a storage network including a fibre channel arbitrated loop and a plurality of fibre channel devices, comprising:

5 segmenting the fibre channel arbitrated loop into a plurality of segments, including a segment pair;

connecting at least some of the plurality of fibre channel devices to each segment of the segment pair;

10 coupling the segments of the segment pair together with an intra-loop router configured to cause fibre channel frames received by the intra-loop router to be re-transmitted onto a selected one of the segments of the segment pair; and

15 selectively forwarding fibre channel frames using the intra-loop router so that fibre channel frames traveling on one of the segments of the segment pair bypass the other segment of the segment pair unless the fibre channel frames target one of the fibre channel devices connected to the other segment of the segment pair.